Journal of Physics: Conference Series 2018 vol.1038 N1

Statistical memory effects in human stride dynamics

Panischev O., Panischeva S., Demin S., Latypov R.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© Published under licence by IOP Publishing Ltd. In paper the Memory functions formalism (MFF) is used to analyze the dynamics of walking stride interval of healthy young adults, healthy old adults and Parkinson's disease. Using the non-Markovian parameter, we determine the degree of manifesting the statistical memory effects in dynamics of the walking stride interval for the considered volunteers. The stride dynamics of the first two volunteer groups demonstrates the low memory effects reflected in high values of non-Markovian parameter.The Parkinsonian patients demonstrate the non- Markovian behavior of stride dynamics with strong memory effects. The method can be used to study the signal dynamics of the different nature.

http://dx.doi.org/10.1088/1742-6596/1038/1/012024

References

[1] Hausdorff J M, Cudkowicz M.E. et al 1998 Mov. Disord. 13 428
[2] Peng C K, Havlin S., Stanley H E et al 1995 Chaos 6 82
[3] Demin S A, Yulmetyev R M, Panischev O Yu and Hänggi P 2008 Phys. A 387 2100
[4] Demin S A, Panischev O Yu and Demina N Yu 2016 J. Phys. Conf. Ser. 741 012073
[5] Yulmetyev R, Hanggi P and Gafarov F 2000 Phys. Rev. E 62 6178
[6] https://physionet.org/physiobank/database/gaitdb/